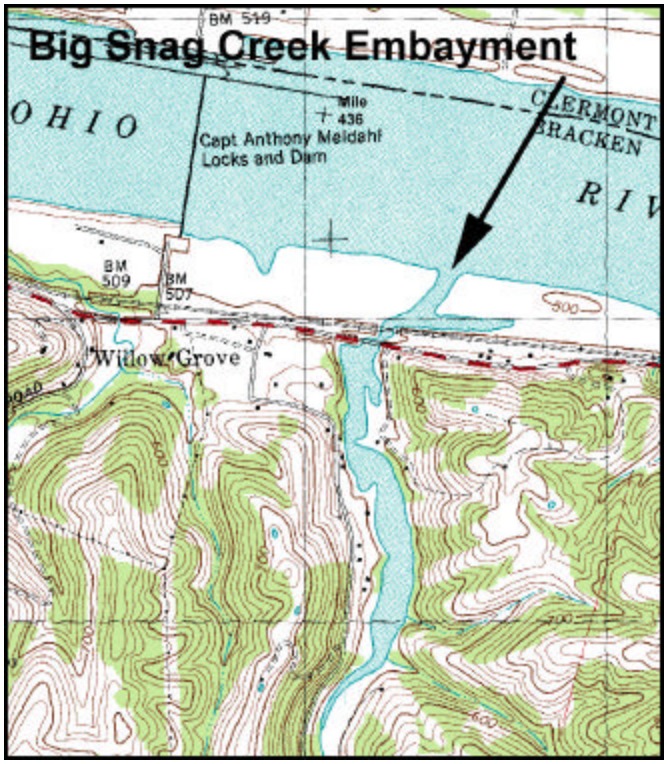
Big Snag Creek Embayment (KY-29)

1.0 Location

The proposed Big Snag Creek Embayment project area is located in Bracken County, Kentucky. The project area is located between the towns of Willow Grove and Bradford, Kentucky. The mouth of Big Snag Creek Embayment enters the Ohio River at river mile 435.8, just upstream of the Meldahl Locks and Dam. The project site is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal, Description, and Rationale

The primary goals of the Big Snag Creek Embayment Restoration project include restoration of the existing embayment to enhance fish and wildlife habitat. The restoration of backwater areas will provide reproductive, feeding, nursery, high water refuge, seasonal migration, and overwintering habitat for many fish species. The project involves dredging and watershed management practices to restore the working components of this backwater area.

Mouth of Big Snag Embayment

Aquatic habitat in Big Snag

3.0 Existing Conditions

Terrestrial/Riparian Habitat: The primary terrestrial and riparian habitat consisted mainly of forested upland areas. There were several residential areas on the banks of the embayment with mowed lawns adjacent to the embayment. There was an agricultural field (tobacco) near the mouth of the embayment.

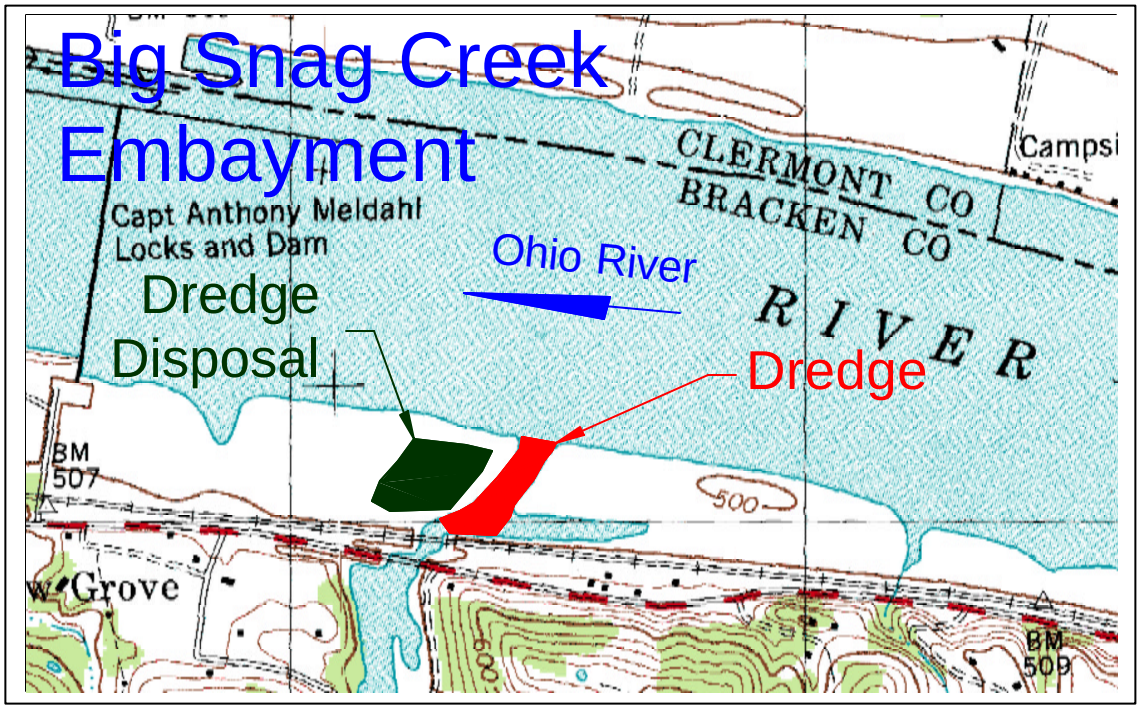
Aquatic Habitats: The Big Snag Creek embayment is a shallow, slackwater embayment. The bottom of the embayment is composed of silt, mud, and organic matter. The site has become filled with sediments primarily from the Ohio River. Sediment and debris from the Big Snag Creek watershed has also contributed to the sedimentation of the embayment.

Wetlands: There were no jurisdictional wetlands present in the project area.

Federally-Listed Threatened and Endangered Species: According to the U.S. Fish and Wildlife Service (USFWS), there is 1 federally-listed endangered species known to occur in Bracken County, Kentucky.

The clubshell (*Pleurobema clava*) is a freshwater mussel that occurs in small rivers and streams in clean sand and gravel (Stansbery et al., 1982). There does not appear to be suitable habitat for this species within the Big Snag Creek Embayment.

4.0 Project Diagram



5.0 Engineering Design, Assumptions, and Requirements

5.1 Existing Ecological/Engineering Concern

The Big Snag Creek embayment has filled with sediments due to several factors. These factors include: raised water levels from the impoundment of the Meldahl Pool; deposition of silt from the Ohio River; and sediments from the Big Snag Creek watershed.

5.2 Embayment Dredging

Maintenance dredging of an area approximately 3.75 acres in size near the mouth of the embayment is required to provide deep water connectivity to the remainder of the embayment and to provide a suitable depth for boater access. An estimated 22,400 cubic yards of silty-clay material would be dredged to restore depths of 9-12 feet in the embayment mouth. A dredge disposal site is adjacent to the embayment. A small levee, 3.5 feet high and 1000 feet in length, would be constructed at the designated disposal site for dewatering.

5.3 Planning/Engineering Assumptions

- A small auger head dredge would be used, and the material would be pumped directly to the disposal site.
- Bottom side slopes will be reshaped to a 3:1.
- All the material required for the levee would be taken from on site.
- A 2,320 gallons per minute (gpm) centrifugal pump would be used for dewatering.

6.0 Cost Estimate (Construction)

Dredging - Engineering costs for the proposed project are contained on Table 1. A detailed MCACES cost estimate for the proposed project is included in Appendix C.

Table 1. Engineering Costs.	
Item	**Cost**
Dredging	$28,100
Levee	$15,800
Dewatering	$4,600
Mobilization	$15,200
TOTAL	**$63,700**

7.0 Schedule

Big Snag Embayment Dredging: The estimated construction time for this project is shown on Table 2.

Table 2. Construction Schedule.	
Item	**Time**
Dredging	31 Days
Levee	10 Days
Dewatering	10 Days
Mobilization	4 Days
TOTAL	**55 Days**

8.0 Expected Ecological Benefits

Terrestrial/Riparian Habitats: The impacts of the Big Bone Creek Embayment restoration project would be primarily in-stream. There would be no foreseeable beneficial impacts to terrestrial or riparian resources as a result of implementing the proposed project.

Aquatic Habitats: Long term beneficial impacts to aquatic resources would be expected as a result of implementing the proposed project. Dredging of the project areas would result in increased aquatic habitat and beneficial impacts to fishes due to permanent water in the deepened embayment. The embayment could serve as feeding, nursery, high water refuge, or over-wintering habitat for many riverine fish species.

Wetlands: There would be no foreseeable beneficial impacts to jurisdictional wetlands as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be no foreseeable beneficial impacts to the clubshell as a result of implementing the proposed project.

Socioeconomic Resources: There would be short-term and long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. The short-term beneficial impacts would be related to costs and local expenditures associated with the dredging in Big Snag Creek embayment. Long-term socioeconomic benefits would be realized through improved recreational fishing opportunities. Long-term indirect beneficial impacts will be

realized through local expenditures for fishing tackle, bait, food, gas, and other associated products.

9.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitats: There would be short-term adverse impacts to terrestrial and riparian resources as a result of implementing the proposed project. Construction related noise and disturbance could cause short-term impacts to terrestrial species.

Aquatic Habitats: There would be potential for adverse affects to aquatic species, especially immobile benthic invertebrates and young-of-the-year fishes during the dredging of the embayment. Sensitive aquatic species downstream of the project area could be impacted due to short-term increases in turbidity as a result of displaced sediments.

Wetlands: There would be no foreseeable adverse impacts to jurisdictional wetlands as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be a slight potential for adverse impacts to the clubshell mussel if it exists downstream of the project area. If present, clubshell mussels downstream of the project area could be impacted by perturbed water conditions as a result of dredging activities.

Socioeconomic Resources: There would be no reasonably foreseeable adverse impacts to socioeconomic resources as a result of implementing the proposed project.

10.0 Mitigation

Minor impacts associated with site dredging and spoil placement may occur during the construction of this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts.

11.0 Preliminary Operation and Maintenance Costs:

Table 3. Operation and Maintenance Costs		
Maintenance	**Frequency**	**Cost**
Maintenance Dredging	2-20 Years	$12,000

12.0 Potential Cost Share Sponsor(s)

- Kentucky Department of Fish and Wildlife Resources
- The Nature Conservancy
- Local marinas
- Local fishing groups
- Towing industry

13.0 Expected Life of the Project

Depending on local management practices within the drainage basin, it is anticipated that the embayment restoration could last approximately 2-25 years.

14.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit.

Site Inspection Findings.

The project site is located in the mouth of Big Snag Creek in Bracken County, Kentucky. The creek flows from south to north where it enters the Ohio River at mile 435.8. The Kentucky towns of Willow Grove and Bradford are respectively 0.2 mile west and 1.8 miles east of the mouth of Big Snag Creek on the Ohio River. Chilo, Ohio is on the north shore of the Ohio River about two miles east of the project site.

The following environmental conditions were considered when conducting the July 14, 1999 project area inspection:

- Suspicious/Unusual Odors;
- Discolored Soil;
- Distressed Vegetation;
- Dirt/Debris Mounds;
- Ground Depressions;
- Oil Staining;
- Above Ground Storage Tanks (ASTs);
- Underground Storage Tanks (USTs);
- Landfills/Wastepiles;
- Impoundments/Lagoons;
- Drum/Container Storage;
- Electrical Transformers;
- Standpipes/Vent pipes;
- Surface Water Discharges;
- Power or Pipelines;
- Mining/Logging; and
- Other.

On the land around the Big Snag Creek embayment are scattered residential homes and agricultural fields. Potential dredge disposal was observed in an agricultural field near the project site.

HTRW Findings and Conclusions

Other than the suspected dredge disposal on land adjacent to the creek embayment, none of the other environmental conditions listed above were observed in the project area.

15.0 Property Ownership

Table 4. Property Characteristics

Site Name: Big Snag Creek Embayment Restoration
Location: Bracken County, Kentucky

Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
11/8	Dr. John Lenox	9495 Eastbroake Drive Westchester, OH 45069	$141,000*	60.00
11/8A	William & Mabel Crellin	1130 Wiltshire Lane Cincinnati, OH 45255	$4,000	.78
11/10	Jerry Tucker	RT 2 Foster, KY 41043	$21,000*	1.63
11/10A	Charles & Ethel Browning	RT 2 Foster, KY 41043	$55,000	2.00
11/10B	Kenneth & Sharon Ridner	C/o Colin & Ellen Covey P.O. Box 501 10 Peoples Street Butler, KY 41006	$63,000*	< 1 acre
11/10C	George & George Ridner	RT 2, P.O. Box 37 Foster, KY 41043	$24,000*	.79
11/10D	Garnett McQuinlan	Foster, KY 41043	$10,000*	2.08
11/10E	William & Wanda Collins	RT 2, P.O. Box 41 Foster, KY 41043	$10,000*	2.73
11/11	Chesapeake & Ohio Railroad	823 East Main St. Richmond, VA 23210		3.00
11/13	Ricky Hamilton	RT 1, P.O. Box 300B Brooksville, KY 41004	$20,000	65.00
20/1A	Gregory & Kimberly Jones	RT 2, P.O. Box 32 Foster, KY 41043	$66,000*	1.45
20/1B	Christopher & Katherine Demoss	RT 2, P.O. Box 31A Fpster, KY 41043	$40,000*	.86
20/2	Tom & Rae Larimer	4315 Redstar Court Cincinnati, OH 45t238	$60,000*	45.00
20/3A	Harry Cline, Jr.	Route 2 Foster, KY	$45,000	14.77
20/4	Harry & Rosemary Cline	Route 2 Foster, KY	$365.000*	318.00

* Denotes improvements on property.

16.0 References

Stansbery et al., 1982	Stansbery, D.H., K. Borror, and K.E. Newman. 1982. Biological abstracts of selected species of Unionid mollusks recovered from Ohio. Unpublished. Ohio Department of Natural Resources.
USFWS, 1999	U.S. Fish and Wildlife Service, 1999. Federally endangered, threatened, and proposed species, Kentucky.

APPENDIX A Threatened & Endangered Species

APPENDIX B Plan Formulation and Incremental Analysis Checklist

Project Site Location: The proposed Big Snag Creek Embayment project area is located in Bracken County, Kentucky. The project area is located between the towns of Willow Grove and Bradford, Kentucky. The mouth of Big Snag Creek Embayment enters the Ohio River at river mile 435.8, just upstream of the Meldahl Locks and Dam. The project site is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).

Description of Plan selected: The primary goals of the Big Snag Creek Embayment Restoration project include restoration of the existing embayment to enhance fish and wildlife habitat. The restoration of backwater areas will provide reproductive, feeding, nursery, high water refuge, seasonal migration, and overwintering habitat for many fish species. The project involves dredging and watershed management practices to restore the working components of this backwater area.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? Yes Reduce the amount of dredging.

Larger Size Plan Possible? Yes Increase the amount of dredging.

Other alternatives? No

Restore/Enhance/Protect Terrestrial Habitats? No **Objective numbers met**

Restore, Enhance, & Protect Wetlands? No **Objective numbers met**

Restore/Enhance/Protect Aquatic Habitats? Yes **Objective numbers met** A1,A6,A7

Type species benefited: Riverine fishes

Endangered species benefited: None

Can estimated amount of habitat units be determined: Approximately 4 acres of embayment habitat would be restored.

Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources? Kentucky Dept. of Fish and Wildlife Resources

Plan considered complete? Yes **Connected to other plans for restoration?** No

Real Estate owned by State Agency? No **Federal Agency?** No
Real Estate privately owned? Yes
If privately owned, what is status of future acquisition Agreements or acquisition for dredge material disposal would be required.

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Restoration provides habitat diversity, spawning habitat, nursery habitat, over-wintering habitat, and winter velocity shelters for fishes.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?
Yes / No
Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity:_____
Non-government Entity _____

Corps Contractor _____Date_____

U.S. Fish & Wildlife Representative _____Date_____

State Agency Representative _____Date _____

U.S. Army Corps of Engineers Representative _____Date _____

Terrestrial Habitat Objectives

T1 Riparian Corridors

T2 Islands

T3 Floodplains

T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

W1 Forested Wetlands: Bottomland Hardwoods

W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands

W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)

A2 Riverine submerged and aquatic vegetation

A3 Sand and gravel bars

A4 Riffles/Runs (tailwaters)

A5 Pools (deep water, slow velocity, soft substrate)

A6 Side Channel/Back Channel Habitat

A7 Fish Passage

A8 Riparian Enhancement/Protection

APPENDIX C Micro Computer-Aided Cost Engineering System (MCACES)